

deutungen der beiden Wörter sie dazu zu prädestinieren scheinen, in irgendein noch nicht näher präzisiertes Verhältnis zueinander zu treten. Ihre Beziehung ist noch nicht grammatikalisiert etwa als *ärgerliche Anspielung* oder *ärgerlich wegen der Anspielung* oder wie immer.

So kann uns das sprachpsychologische Experiment dazu verhelfen, eine Schicht des Sprachlichen freizulegen, die den Linguisten leicht entgeht: die Schicht der semantischen Beziehungen. Sie lagert sich der Schicht der Einzelemaneme auf und stellt ihrerseits die Grundlage für die Schicht des Grammatischen dar. Die Rolle des Grammatischen besteht also nicht darin, Beziehungen zwischen den lexikalischen Bestandstücken allererst zu stiften, sondern darin, die vagen semantischen Beziehungen mit Hilfe bestimmter Kategorien zu präzisieren.

LITERATUR: BÜHLER, K., *Sprachtheorie*. Jena, 1934.

## PSYCHOLINGUISTIC RELATIVITY AND UNIVERSALITY

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We associate the notion of psycholinguistic relativity most closely with the name of the linguist Benjamin Lee Whorf. Drawing on his extensive comparative studies of SAE (Standard Average European) and American Indian languages, Whorf framed the general hypothesis that how a person perceives the world about him, how he thinks, and even how he formulates his basic philosophy—thus, his *Weltanschauung*—depends upon the language he uses.

Certainly human languages display uniquenesses—the crude criterion of lack of mutual intelligibility is sufficient proof. Different languages make different selections from the common phonetic stock upon which to erect their phonemic contrasts. Grammatical systems differ in both obvious and subtle ways; for example, English grammar makes it obligatory to code temporal relations, past, present and future, whereas Hopi does not, and as Whorf has argued so eloquently, SAE treats time as a mass noun and hence as a uniform quantity like cheese that can be divided into chunks of various sizes. Similarly the lexicon of any language is a largely arbitrary set of correlations between linguistic and non-linguistic events—what the English call *horse* and the French call *cheval*, what the

Eskimo may handle with a variety of labels (e.g., snow), SAE handles with one, and so on.

The Whorf Hypothesis is concerned with *psycholinguistic*, not sheer linguistic, relativity vs. universality. That is, it deals with relations *between* linguistic and psychological (cognitive) processes. In this paper I will try to demonstrate—of necessity, briefly—that there is sufficient positive evidence to support *both* the hypothesis of psycholinguistic relativity and its converse, the hypothesis of psycholinguistic universality. Finally, I shall try to show that the apparent dilemma of these contrary hypotheses can be resolved by a more inclusive principle governing relations between language and cognition—namely, that psycholinguistic relativity holds for denotative aspects and psycholinguistic universality for connotative aspects of language behavior.

#### EVIDENCE FOR DENOTATIVE RELATIVITY

There are several difficulties with Whorf's own materials as far as scientific evidence is concerned. In the first place it is largely anecdotal; lacking the customary controls of scientific experimentation, his examples must stand as hypothesis-setting rather than as hypothesis-testing demonstrations. Secondly, the anecdotes usually hinge on literal translation from some other language (usually an Indian language) into SAE (usually English), with comments then being made upon the strangeness of the world view apparently expressed.

On the other hand, there is at least some adequately designed experimental evidence. I shall cite one of the clearest studies available. The first deals with the color lexicon and comes from a series of papers by Brown and Lenneberg and Lenneberg himself. The color spectrum is an ideal aspect of the environment to study psycholinguistically because it is continuous in human experience whereas color terminologies are categorical. Working first on the intracultural level, it was shown that sections of the spectrum (i.e., particular color chips) vary in their *codability* for English-speaking subjects; whereas a chip near 680  $\mu$  might be consistently called 'red' with short latency, a chip near 600  $\mu$  might be labeled slowly, variably and with complex circumlocutions. The psycholinguistic question was this: do differences in codability relate to some independently measurable cognitive process? First *recognition* and then *ease of learning* were studied, and in both cases it was shown that ease of cognitive manipulation varied with codability of the color stimuli. Working cross-culturally, it was shown that Zuni speakers display the same relation

between codability and cognitive facility, even though the relative codabilities of various portions of the spectrum did not correspond for Zuni and English speakers—i.e., their denotative assignments were arbitrarily different.

#### EVIDENCE FOR CONNOTATIVE UNIVERSALITY

For the past 10 years a group of us at the University of Illinois has been working on the theory and measurement of certain aspects of meaning. The theory derives from a two-stage mediation type learning theory and the measurement technique is what has come to be called "the semantic differential".

By way of sharpening this point, let me tell you about two studies on the meanings of facial expressions. In the first, done nearly 20 years ago when I was a graduate student at Yale, 40 different labels for emotional states were posed by live student actors while other students judged what was intended in each case by selecting from the same 40 labels written on the blackboard. We analyzed the "language" of emotional expression, e.g., how the usage of labels is structured. Three factors nearly exhausted the total variance.

In a more recent experiment conducted by Professor Albert Hastorf of Dartmouth College and myself, a 12-scale form of semantic differential was constructed to represent these apparent factors and poses were photographed to deliberately sample the whole space.

Nine different "intentions" were posed: *glee*, *passive adoration*, *complacency*, *amazement*, *optimistic determination*, *dismay*, *rage*, *mild repugnance*, and *puzzlement*.

I know I never had such high factor loadings which, incidentally, testifies to the reliability of judgments of facial expressions *when their affective meanings rather than their labels are measured*. While the first two factors are clearly *pleasantness* and *activation*, as anticipated, the third turned out to be *clearness* or *intensionality* rather than *tight hardness* as we had expected. Taken together, three factors account for 95 % of the total variance.

Now we are ready to ask the question which is our main concern here—to what extent are such basic affective meaning factors general across human individuals, regardless of differences in both language and culture? The ideal design for research here would be as follows: (1) representative sampling of polar qualifiers (e.g., adjectival opposites in English) within each language-culture community studied; (2) determination of the facto-

rial structure among these qualifiers, (a) when simply related to each other on an absolute basis and (b) when used as dimensions against which to describe representative samples of concepts; (3) demonstration that the factor structure stays essentially constant (a) when bilinguals are compared in their two languages—to show that language code *per se* does not affect semantic factor structure, and (b) when monolinguals speaking different languages are compared—to show that cultural differences do not affect semantic factor structure. In our present research, supported by the Society for the Investigation of Human Ecology, we are trying to adhere to this ideal design—it involves some 10 language-culture communities around the world. In the studies which I will now report, however, we began by translating qualifier dimensions from English into the other languages, and the results are to that extent liable to bias.

The first study in this series was conducted by Kumata and compared the factor structures obtained for Americans with those obtained for Japanese and Korean bilinguals and for Japanese monolinguals.

It can be seen that, not only are the coefficients of factorial similarity exceptionally high, but those for Japanese and Korean bilinguals taking the tests in different languages are as high as for Americans merely taking the same test twice. This, I think, is impressive evidence that the structure of the language code itself does not influence semantic structure.

Another cross-cultural study I will describe is a little different in that it deals with synesthetic relationships between visual and verbal materials, but it also supports the hypothesis of psycholinguistic universality.

We have evidence for a high degree of universality in what visual alternatives are perceived as synesthetically appropriate to translation-equivalent word meanings.

#### SUGGESTED RESOLUTION OF AN APPARENT PARADOX

We thus have the apparent paradox of experimental evidence supporting both the hypothesis of psycholinguistic relativity and its converse the hypothesis of psycholinguistic universality. The situation is paradoxical only if we can discover no basis for distinguishing the phenomena fitting one hypothesis from those fitting the other. At the beginning of this paper I suggested a basis for distinction—namely, that *denotative* psycholinguistic relations would display relativity whereas *connotative* relations would display universality. But first I must define my usage of these terms—then you may question the propriety of my choice of terms, but you will at least know what I am talking about.

By the *denotative meaning* of a sign I refer to the essentially arbitrary, conventional correlation between a linguistic and a non-linguistic behavioral event. In language *encoding* non-linguistic perceptual signs such as the sight of an APPLE object, are correlated with specific linguistic reactions such as saying "apple," or "Apfel," or "pomme"; in language *decoding* linguistic signs, such as hearing these words for *apple* spoken or seeing them written, are correlated with classes of object-relevant behavior such as searching for, pointing to, picking up, and manipulating the object APPLE. Persons *A* and *B* will be said to agree in denotative meaning when they display the same sets of correlations, e.g., when looking at APPLE object both say "apple" (encoding) and when told to "Show me the apple" both point to the same APPLE object (decoding).

By the *connotative meaning* of a sign I refer to the symbolic process in a language-using organism which occurs as an implicit response to the sign as stimulus (decoding) and as an implicit stimulus to the overt expression of the sign as a response (encoding). In other words, the connotative meanings of signs are identified with the representational mediating processes. This is the "meaning" presumably indexed by the dominant factors of the semantic differential. Two persons, *A* and *B*, may be said to agree in connotative meaning when they experience the same symbolic state, i.e., produce the same profile for the sign against the semantic differential.

A more typical situation, and the one in which the semantic differential has had its main practical application, is that in which persons *A* and *B* agree denotatively, but not connotatively. Imagine that person *A* is normal but that person *B* is both color-blind and allergic to apples—they make him deathly sick. Nevertheless, as person *B* learns the English code, utilizing the totality of cues available, he will come to display the same conventional labeling correlations as person *A*—he will also call APPLE objects "apple" and point to them on request. Yet, because of his color-blindness and his allergy, he will not experience apples the same way and will produce a different semantic profile (e.g., *bad*, *distasteful*, *unpleasant*, etc.). When we give semantic differentials to members of different parties in a political campaign and they judge "Eisenhower," "Stevenson," and "The Late Senator McCarthy" quite differently in terms of *evaluation*, *potency*, and *activity*, we assume that they would nevertheless agree on the denotative reference of these terms, e.g., in labeling and pointing to photographs.

In conclusion my proposal is that the Sapir-Whorf hypothesis of psycho-

linguistic relativity will find support in studies dealing with denotative relations whereas the converse hypothesis of psycholinguistic universality will find support in studies dealing with what I have termed connotative relations.

## SPRECHBEWEGUNGEN UND RETENTION

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### I

Die Entwicklung der psychologischen Kenntnisse deckt immer gründlicher und breiter den aktiven Charakter der Erkenntnis der objektiven Wirklichkeit vom Menschen auf. Welt existiert außer uns und unabhängig von uns, und deren Erkenntnis ist Widerspiegelung von ihr so, wie sie für sich existiert. Aber die Erkenntnis der realen Wirklichkeit, das Zusammenfallen des Gedankens mit dem Objekt ist *der Prozess*, der aktiven Charakter hat. Man kann sich nicht die Wahrheit als tote Stille, ohne Streben, ohne Bewegung vorstellen. Sie wird durch die aktive Erkenntnistätigkeit des Menschen erreicht.

Die Formen der Aktivität in der Erkenntnis der Wirklichkeit sind sehr verschiedenartig. Trotz ihrer Vielfalt sind sie aber ihrer Herkunft nach untrennbar mit der *Bewegungstätigkeit* der Menschen verbunden. Stets ist diese Tätigkeit in der Erkenntnis der Menschen vertreten.

Mit großer Klarheit wurde die Bedeutung der Bewegungen in der Erkenntnis der Wirklichkeit im 19. Jahrh. von dem russischen Physiologen I. M. *Setschenov* gezeigt. Indem er alle psychischen Prozesse ihrer Herkunft nach als Reflexe betrachtete, hielt er die Muskelbewegung für die notwendige Tatsache, zu der die Analyse jeder Tätigkeit des Menschen führt, darunter auch die der rezeptorischen Prozesse, also der Empfindungen und der Wahrnehmungen. Insoweit die Empfindungen und Wahrnehmungen als Ergebnis der Auswirkung der Gegenstände der realen Welt auf uns entstehen, sind sie Affferenzprozesse. Gleichzeitig aber haben sie immer Efferenzbestandteile. Es sind demnach Affferenz-Efferenzprozesse. Ebenso werden sie von der reflektorischen Theorie von *Setschenov* und *Pavlov* verstanden. Das traditionelle Schema, wonach der Reiz die ins Gehirn übertragene Erregung weckt, erklärt richtig nur einen Teil des physiologischen Mechanismus der Rezeption. Es kann aber nicht